Worksheet 1 **Period** ____ **Name** _____

AP Biology / Bratcher Chemistry Review

1. Define the following:

Element-

Atom-

Electron-

Neutron-

Proton-

Compound-

Atomic number-

Mass number-

Isotope-

Anion-

Cation-

Potential energy-

Valence electrons-

Ionic bond-

Electronegativity-

Nonpolar covalent bond-

Van der Waals Interactions (p32)-

Trace element-

___ 2. The atomic number of sulfur is 16. Sulfur combines with hydrogen by covalent bonding to form a compound, hydrogen sulfide. Based on the electron configuration of sulfur, we can predict that the molecular formula of the compound will be

a. HS b. HS_2 c. H_2S d. H_3S_2 e. H_4S

___ 3. Atoms can be represented by simply listing the number of protons, neutrons, and electrons – for example, $2p^+$, $2n^0$, $2e^-$ for helium.
Which atom represents the ^{18}O isotope of oxygen?

a. $6p^+$; $8n^0$; $6e^-$
b. $8p^+$; $10n^0$; $8e^-$
c. $9p^+$; $9n^0$; $9e^-$
d. $7p^+$; $2n^0$; $9e^-$
e. $10p^+$; $8n^0$; $10e^-$

___ 4. The chemical properties of an atom are most closely associated with its

a. atomic number
b. atomic weight
c. number of neutrons in the nucleus
d. all the above
e. none of the above

___ 5. The noble gases readily unite with other elements

a. true b. false

___ 6. A cation

a. has gained an electron
b. can easily form hydrogen bonds
c. is more likely to form from an atom with six or seven electrons in its' valence shell
d. has a positive charge
e. Both c and d are correct

___ 7. A sodium ion (Na^+) contains 10 electrons, 11 protons, and 12 neutrons. What is the atomic number of sodium?

a. 10 b. 11 c. 12 d. 23 e. 33

___ 8. How many covalent bonds is a sulfur atom most likely to form?(see #2)

a. 1 b. 2 c. 3 d. 4 e. 5

___ 9. Compared to ^{31}P, the radioactive isotope ^{32}P has

a. a different atomic number
b. one more neutron
c. one more proton
d. one more electron
e. a different charge

___ 10. What coefficients must be placed in the blanks to balance this chemical reaction?

$$C_6H_{12}O_6 \longrightarrow \_\_\_\_\ C_2H_6O + \_\_\_\_\ CO_2$$

a. 1; 2 b. 2; 2 c. 1; 3 d. 1; 1 e. 3; 1

___ 11. Which of the following statements correctly describes any chemical reaction that has reached equilibrium?

a. The concentration of products equals the concentration of reactants
b. The rate of the forward reaction equals the rate of the reverse reaction

c. Both the forward and reverse reactions have halted
d. The reaction is now irreversible
e. No reactants remain

___ 12. Each element is unique and different from other elements because of its
a. atomic number
b. atomic weight
c. mass number
d. only a and b are correct
e. a, b and c are correct

___ 13. What do atoms form when they share electron pairs
a. elements
b. ions
c. aggregates
d. isotopes
e. molecules

___ 14. When two atoms are equally electronegative, they will interact to form
a. equal number of isotopes
b. ions
c. polar covalent
d. nonpolar covalent bonds
e. ionic bonds

___ 15. What bond(s) is (are) easily disrupted in the presence of water?
a. covalent
b. polar covalent
c. ionic
d. only a and b
e. a, b, and c are correct

___ 16. Which of the following is a trace element that is essential to humans?
a. nitrogen
b. calcium
c. iodine
d. carbon
e. oxygen

___ 17. How many electrons would be expected in the outer energy level of an atom with atomic number 17?
a. 2 b. 5 c. 7 d. 8 e. 17

___ 18. What bond does NH_4 form with Cl to make ammonium chloride salt?
a. nonpolar covalent bond
b. polar covalent bond
c. hydrogen bond
d. ionic bond

___ 19. Which of the following is NOT considered a weak molecular interaction?
a. covalent bond
b. ionic bond in the presence of water
c. hydrogen bond
d. Van der Waals interactions

Short Answer:

20. Write the structural formula for O_2.

21. In question #20, O_2 represents the _____ formula.

22. What kind of bond forms when the electronegativity of the atoms are very different?

23. List the three forms of matter.

24. Why are weak bonds important in biology?

25. Why is a molecule's shape and size biologically important to its function in a living cell?